**What is claimed is:**

1. An optical scanner comprising:

a housing having a substantially vertical surface containing a first aperture and a substantially horizontal surface containing a second aperture;

a single laser which produces a laser beam within the housing;

a polygon spinner having mirrored facets for reflecting the laser beam in a plurality of directions to produce a plurality of scanning beams including a first group of scanning beams, a second group of scanning beams, and a third group of scanning beams; and

a plurality of pattern mirrors, including a plurality of groups of pattern mirrors, for reflecting the first group of scanning beams through the first aperture to produce a first scan pattern consisting of a plurality of intersecting scan lines, for reflecting the second group of scanning beams through the first aperture to produce a second scan pattern consisting of a plurality of intersecting scan lines, and for reflecting the third group of scanning beams through the second aperture to produce a third scan pattern consisting of a plurality of intersecting scan lines.

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2. The optical scanner as recited in claim 1, further comprising:

an optical transceiver for passing the laser beam and for collecting reflected light from the scanned article; and

a photodetector for generating signals representing the intensity of the light reflected from an article having a bar code label to be scanned.

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3. The optical scanner as recited in claim 1, wherein the housing comprises:

a substantially horizontal surface containing the first aperture; and

a substantially vertical surface containing the second aperture.

4. The optical scanner as recited in claim 1, wherein the laser comprises a laser diode.

5. The optical scanner as recited in claim 1, wherein the spinner has four planoreflective facets.

6. The optical scanner as recited in claim 5, wherein the four facets are oriented at different angles with respect to a predetermined reference.

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~~7~~. The optical scanner as recited in claim 1, wherein the pattern mirrors are flat.

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~~8~~. The optical scanner as recited in claim 1, wherein the pattern mirrors comprise:

a first group of mirrors for reflecting the laser beam from the spinner;

a second group of mirrors for reflecting the laser beam from the first group of mirrors; and

a third group of mirrors for reflecting the laser beam from some of the mirrors in the second group of mirrors.

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~~9~~. The optical scanner as recited in claim 6, wherein the angles of pairs of opposite facing facets have values which tend to balance the spinner.

10. An optical scanner comprising:

a housing including a substantially vertical surface containing a first aperture and a substantially horizontal surface containing a second aperture;

a laser diode for producing a laser beam;

an optical transceiver for passing the laser beam and for collecting reflected light from an article having a bar code label to be scanned;

a spinner having a plurality of sides oriented at different angles with respect to a predetermined reference for reflecting the laser beam in a plurality of directions to produce a plurality of scanning beams, and for directing light from the article to the optical transceiver; and

a plurality of pattern mirrors for reflecting a first group of scanning beams in a substantially horizontal direction through the first aperture, a second group of scanning beams in a substantially downward diagonal direction through the first aperture, and a third group of scanning beams in a substantially vertical direction through the second aperture and including a first group of mirrors for reflecting the laser beam from the spinner, a second group of mirrors for reflecting the laser beam from the first group of mirrors, and a third group of mirrors for reflecting the laser beam from some of the mirrors in the second group of mirrors; and

a photodetector for generating signals representing the intensity of the light reflected from the article.

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11. A method for scanning an article having a bar code label with minimal article orientation comprising the steps of:

(a) generating a single laser beam;

(b) providing a polygon spinner including a plurality of mirrored facets;

(c) reflecting the laser beam from the polygon spinner at a plurality of pattern mirrors within a scanner housing; and

(d) reflecting a first group of scan lines from the pattern mirrors through a vertical aperture within the scanner housing to produce a first scan pattern consisting of a plurality of intersecting scan lines, reflecting a second group of scan lines from the pattern mirrors through ~~a~~ said vertical aperture within the scanner housing to produce a second scan pattern consisting of a plurality of intersecting scan lines, and reflecting a third group of scan lines through a horizontal aperture within the scanner housing to produce a third scan pattern consisting of a plurality of intersecting scan lines.

12. The method as recited in claim 11, further comprising the step of:

(e) moving the article through the scan lines.

13. The method as recited in claim 11, wherein step (c) comprises the substep of:

(1) rotating a spinner having a plurality of mirrored facets in the path of the laser beam, each facet having a predetermined elevation angle; and

(2) reflecting the laser beam from each of the facets in turn as the spinner rotates.

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14. The method as recited in claim 13, wherein the spinner has four mirrored facets.

15. The method as recited in claim 13, wherein substep (c-1) comprises the substep of:

(A) energizing a motor coupled to the spinner.

16. The method as recited in claim 11, wherein step (d) comprises the substeps of:

(1) reflecting the laser beam from the spinner by a first group of the pattern mirrors; and

(2) reflecting the laser beam from the first group of the pattern mirrors to a second group of the pattern mirrors; and

(3) reflecting the laser beam from some of the pattern mirrors in the second group to a third group of the pattern mirrors.

17. The method as recited in claim 16, ~~wherein the housing has substantially horizontal and vertical apertures and~~ wherein substep (d) further comprises:

(3) reflecting a first group of the scan lines through the vertical aperture in a substantially horizontal direction through the first aperture;

(4) reflecting a second group of scanning beams in a substantially downward diagonal direction through the first aperture; and

(5) reflecting a third group of the scan lines through the horizontal aperture in a substantially vertical direction through the second aperture.

18. A method of scanning an item having a bar code from multiple directions, comprising the steps of

generating laser light;

providing a single multi-faceted mirrored polygon in a path of said laser light;

generating a first group of scanning beams, a second group of scanning beams, and a third group of scanning beams by reflecting said laser light off said mirror polygon;

directing said first group of scanning beams through a first transparent member oriented in a first plane to scan a surface of the item from one orthogonal direction;

directing said second group of scanning beams through the first transparent member oriented in the first plane to scan the item from a diagonal direction; and

directing said third group of scanning beams through a second transparent member oriented in a second plane orthogonal to said first plane to scan the item from another orthogonal direction.

19. A method of scanning an item having a bar code from multiple directions, comprising the steps of

providing a single multi-faceted mirror polygon in a scanner housing;

impinging laser light onto said mirror polygon;

rotating said mirror polygon;

generating a first group of scanning beams, a second group of scanning beams, and a third group of scanning beams by reflecting said laser light off said mirror polygon as it is being rotated;

directing said first group of scanning beams through a first transparent member oriented in a first plane to scan a surface of the item from a first orthogonal direction;

directing said second group of scanning beams through the first transparent member oriented in the first plane to scan the item from a diagonal direction; and

directing said third group of scanning beams through a second transparent member oriented in a second plane at about ninety degrees to said first plane to scan the item from another orthogonal direction.

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20. A method of scanning an item having a bar code label thereon from multiple directions, comprising the steps of:

generating laser light;

providing a single multi-faceted mirror polygon in a scanner housing;

producing a first group of scanning beams, a second group of scanning beams, and a third group of scanning beams by reflecting the laser light off the mirrored polygon;

directing the first, second, and third groups of scanning beams to a first group of pattern mirrors;

reflecting the first, second, and third groups of scanning beams off the first group of pattern mirrors towards a second group of pattern mirrors;

reflecting the first group of scanning beams off the second group of pattern mirrors and out a first surface

to produce a first scan pattern consisting of a plurality of intersecting scan lines;

reflecting the second and third groups of scanning beams off the second group of pattern mirrors towards a third group of pattern mirrors;

reflecting the second group of scanning beams off the third group of pattern mirrors and out a second surface which is arranged orthogonally to the first surface to produce a second scan pattern consisting of a plurality of intersecting scan lines; and

reflecting the third group of scanning beams off the third group of pattern mirrors and out the second surface to produce a third scan pattern consisting of a plurality of intersecting scan lines.

21. A bar code scanning system comprising:

a housing having a first window and a second window arranged generally orthogonally to one another;

a first set of pattern mirrors positioned adjacent the first window;

a second set of pattern mirrors positioned adjacent the second window, including first, second, and third subsets of pattern mirrors;

a laser within the housing which produces a laser beam;

a single scanning means within the housing comprising a mirror polygon; and

a motor for rotating the mirror polygon;

wherein said mirror polygon reflects a first group of scanning beams across the first set of pattern mirrors and out the first window, reflects a second group of scanning beams across the first and third subsets of pattern mirrors and out the second window, and reflects a third group of scanning beams across the second and third subsets of pattern mirrors and out the second window.

22. A mirror assembly for use in an optical scanner having a substantially vertical aperture and a substantially horizontal aperture, comprising:

a first set of pattern mirrors including at least primary and secondary mirrors, and at least one tertiary mirror;

a second set of pattern mirrors including at least primary, secondary, and tertiary mirrors;

a third set of pattern mirrors including at least primary and secondary mirrors;

wherein each of the primary mirrors of the first set being disposed to receive an incident light beam at an oblique angle to reflect the incident beam onto at least one of the secondary mirrors of the first set;

wherein each of the secondary mirrors of the first set being disposed to receive an incident light beam at an oblique angle to reflect the incident beam onto at least one of the tertiary mirrors of the first set;

wherein the tertiary mirror of the first set being disposed at an oblique angle with respect to an incident light beam from at least one of the secondary mirrors of the first set, and positioned to reflect the incident beam outwardly and downwardly through said substantially vertical aperture;

wherein each of the primary mirrors of the second set being disposed to receive an incident light beam at an oblique angle to reflect the incident beam onto at least one of the secondary mirrors of the second set;

wherein each of the secondary mirrors of the second set being disposed to receive an incident light beam at an oblique angle to reflect the incident beam onto at least one of the tertiary mirrors of the second set;

wherein each of the tertiary mirrors of the second set being disposed at an oblique angle with respect to an incident light beam from at least one of the secondary mirrors of the second set, and positioned to reflect the incident beam through said substantially vertical aperture;

wherein each of the primary mirrors of the third set being disposed to receive an incident light beam at an

oblique angle to reflect the incident beam onto at least one of the secondary mirrors of the third set;

wherein each of the secondary mirrors of the third set being disposed to receive an incident light beam at an oblique angle to reflect the incident beam through said substantially horizontal aperture;

wherein the primary mirrors of the first set include a plurality of generally trapezoidal mirrors;

wherein the secondary mirrors of the first set operate to receive a light beam from said generally trapezoidal mirrors; and

wherein the tertiary mirror of the first set is a generally trapezoidal mirror which operates to receive a light beam from said secondary mirrors of the first set.

23. A mirror assembly for use in an optical scanner having a substantially horizontal aperture and a substantially vertical aperture, comprising:

a first set of pattern mirrors including at least primary and secondary mirrors, and at least one tertiary mirror;

a second set of pattern mirrors including at least primary, secondary, and tertiary mirrors;

a third set of pattern mirrors including at least primary and secondary mirrors;

a source of light beams;

wherein the primary mirrors of the first set are disposed at oblique angles with respect to an incident light beam from said source, to reflect the light beam onto the secondary mirrors of the first set;

wherein the secondary mirrors of the first set are disposed at oblique angles with respect to an incident light beam from said source, to reflect the light beam onto the tertiary mirror of the first set;

wherein the tertiary mirror of the first set is disposed at oblique angles with respect to an incident light beam from the secondary mirrors of the first set, and positioned to reflect light outwardly and downwardly through said substantially vertical aperture;

wherein the primary mirrors of the second set are disposed at oblique angles with respect to an incident light beam from said source, to reflect light onto the secondary mirrors of the second set;

wherein the secondary mirrors of the second set are disposed at oblique angles with respect to an incident light beam from said source, to reflect light onto the tertiary mirrors of the second set;

wherein the tertiary mirrors of the second set are disposed at oblique angles with respect to an incident light beam from the secondary mirrors of the second set, and

positioned to reflect light outwardly through said substantially vertical aperture;

wherein the primary mirrors of the third set are disposed at oblique angles with respect to an incident light beam from said source, to reflect light onto the secondary mirrors of the third set;

wherein the secondary mirrors of the third set are disposed at oblique angles with respect to an incident light beam from the primary mirrors of the third set, and positioned to reflect light outwardly through said substantially horizontal aperture;

wherein the primary mirrors of the first set include a plurality of generally trapezoidal mirrors;

wherein the secondary mirrors of the first set operate to receive a light beam from said generally trapezoidal mirrors; and

wherein the tertiary mirror of the first set is a generally trapezoidal mirror which operates to receive a light beam from said secondary mirrors of the first set.

24. An optical scanner for scanning the surfaces of an object by means of light beams from a substantially vertical aperture and a substantially horizontal aperture, comprising:

a housing having said substantially vertical and horizontal apertures;

a rotating mirror polygon positioned at a predetermined location within an area in said housing;

at least first, second, and third sets of pattern mirrors located within the housing along the periphery of said area;

said first set of pattern mirrors being located in one region along said periphery, and having primary and secondary mirrors, and at least one tertiary mirror for reflecting light beams outwardly and downwardly through said substantially vertical aperture;

said second set of pattern mirrors being located in a similar region along said periphery, and having primary, secondary, and tertiary mirrors for reflecting light beams outwardly through said substantially vertical aperture;

said third set of pattern mirrors being located in a different region along said periphery, and having primary and secondary mirrors for reflecting light beams through said substantially horizontal aperture;

wherein the primary mirrors of the first set include a plurality of generally trapezoidal mirrors;

wherein the secondary mirrors of the first set operate to receive a light beam from said generally trapezoidal mirrors; and

wherein the tertiary mirror of the first set is a generally trapezoidal mirror which operates to receive a light beam from said secondary mirrors of the first set.

25. An optical scanner as in claim 24, in which said rotating mirror polygon produces light beams that pass radially outward therefrom to scan the primary mirrors of the first set of pattern mirrors, one after another, to scan the primary mirrors of the second set of pattern mirrors, one after another, and to scan the primary mirrors of the third set of pattern mirrors, one after another.

26. An optical scanner as in claim 24, in which said rotating mirror polygon reflects light beams onto the primary mirrors of said first, second, and third sets of pattern mirrors as it rotates.

27. An optical scanner as in claim 24, in which said rotating mirror polygon reflects light onto the primary mirrors of said first, second, and third sets of pattern mirrors.

28. A mirror assembly for use in an optical scanner having a substantially vertical aperture and a substantially horizontal aperture, comprising:

a first set of pattern mirrors including at least primary and secondary mirrors, and at least one tertiary mirror;

a second set of pattern mirrors including at least primary, secondary, and tertiary mirrors;

a third set of pattern mirrors including at least primary and secondary mirrors;

a source of light;

the primary mirrors of the first set being disposed at oblique angles with respect to the source of light, to reflect the source of light onto the secondary mirrors of the first set;

the secondary mirrors of the first set being disposed at oblique angles with respect to incident light beams from the primary mirrors of the first set, and positioned to reflect the light beams onto the tertiary mirror of the first set;

the tertiary mirror of the first set being disposed at oblique angles with respect to incident light beams from the secondary mirrors of the first set, and positioned to reflect the light beams outwardly and downwardly through said substantially vertical aperture;

the primary mirrors of the second set being disposed at oblique angles with respect to the source of light, to reflect the source of light onto the secondary mirrors of the second set;

the secondary mirrors of the second set being disposed at oblique angles with respect to the source of light, to reflect the source of light onto the tertiary mirrors of the second set;

the tertiary mirrors of the second set being disposed at oblique angles with respect to incident light beams from the secondary mirrors of the second set, and positioned to reflect the light beams outwardly through said substantially vertical aperture;

the primary mirrors of the third set being disposed at oblique angles with respect to the source of light, to reflect the source of light onto the secondary mirrors of the third set;

the secondary mirrors of the third set being disposed at oblique angles with respect to the source of light, to reflect the source of light beams through said substantially horizontal aperture; and

the primary mirrors of the first set including two pairs of opposite side mirrors.

29. A mirror assembly as in claim 28, wherein the secondary mirrors of the first set include opposite groups of three mirrors, wherein each secondary mirror operates to receive a light beam from one of the primary mirrors of the first set.

30. A mirror assembly as in claim 28 in which at least two of the secondary mirrors of the first set operate to receive a light beam from a common primary mirror of the first set.

31. An optical scanner as in claim 28, in which the source of light includes a rotating mirrored surface that directs light onto the primary mirrors of said first, second, and third sets of pattern mirrors as it rotates.

32. An optical scanner as in claim 28, in which the source of light includes a rotating polygon with mirrors on each its sides to reflect light onto the primary mirrors of said first, second, and third sets of pattern mirrors.

33. An optical scanner comprising:

a housing including a substantially vertical surface containing a first aperture and a substantially horizontal surface containing a second aperture;

first and second lasers for producing first and second laser beams;

an optical transceiver for passing the laser beam and for collecting reflected light from an article having a bar code label to be scanned;

a spinner having a plurality of sides oriented at different angles with respect to a predetermined reference for reflecting the first and second laser beams in a plurality of directions to produce a plurality of scanning beams, and for directing light from the article to the optical transceiver; and

a plurality of pattern mirrors for reflecting a first group of scanning beams in a substantially horizontal direction through the first aperture, a second group of scanning beams in a substantially downward diagonal direction through the first aperture, and a third group of scanning beams in a substantially vertical direction through the second aperture and including a first group of mirrors for reflecting the laser beam from the spinner, a second group of mirrors for reflecting the laser beam from the first group of mirrors, and a third group of mirrors for

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reflecting the first and second laser beams from some of the mirrors in the second group of mirrors; and

a photodetector for generating signals representing the intensity of the light reflected from the article.

34. An optical scanner as recited in claim 33, further comprising:

control circuitry which alternately applies power to the first and second lasers.

35. An optical scanner as recited in claim 33, wherein the first and second lasers have different depths of field.